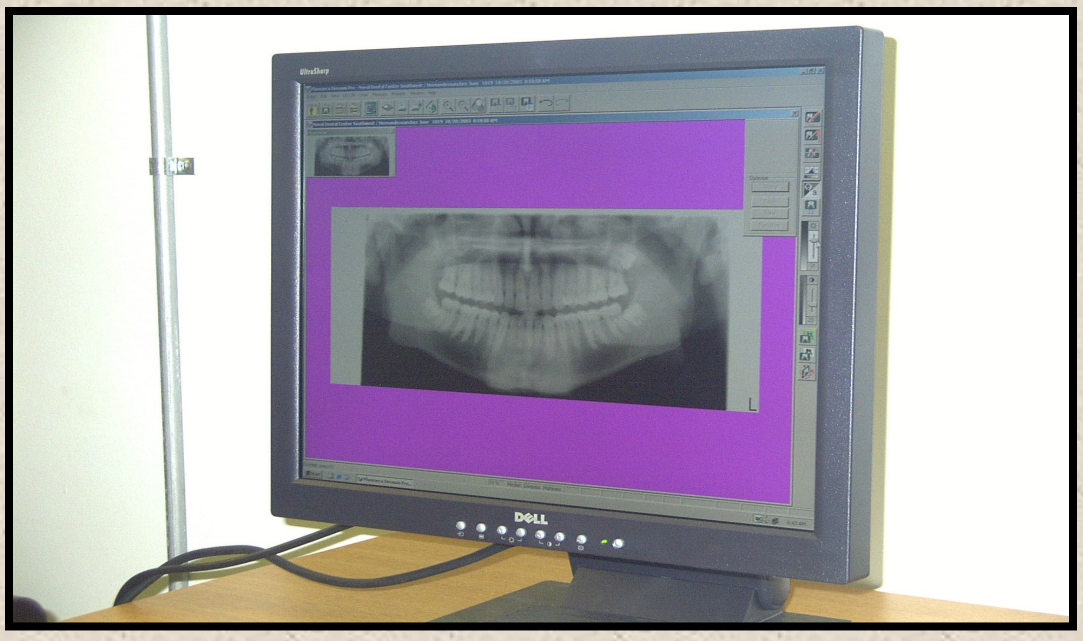
The Implementation of Digital Imaging at BDC, MCRD

Naval Dental Center
Southwest, October, 2003



Why Digital Imaging?

- Digital Radiography requires much less (60% - 90%) radiation to create an image than film.
- When the image is digitized, it can be manipulated electronically.
- There is less exposure to ionizing radiation for the patient.
- A digital x-ray has more data than our eyes can see and using software to analyze that data makes for a better diagnosis.

Benefits of Digital Imaging

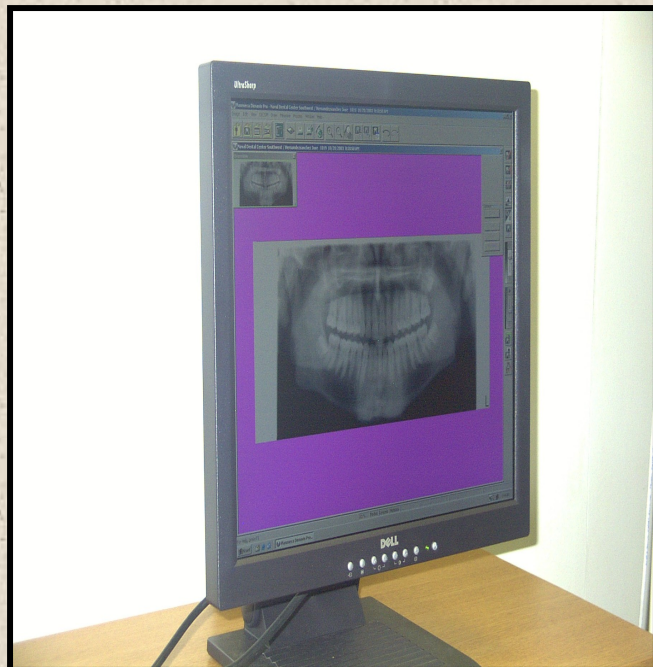
- No film and film associated expenses
- No hazardous chemicals
- Greater gray-scale resolution.
- Image enhancement capabilities.
- Fast image acquisition
- Image can be stored electronically.
- Time reduced in developing.
- Reduced radiation dosage to patien
- Real time viewing of the image.
- Image can be electronically transmitted to another facility for consultation.

Patient Safety Issues

- Reduction in radiation exposure to patients.
- Reduction in the number of times the radiographs change hands thus lessening the likelihood of radiograph/patient mismatches.
- The ability to electronically enhance images potentially eliminates subjecting patients to re-takes thus decreasing exposure risk.
- Higher quality images that would facilitate earlier detection of pathology.
- Digitally labeled and stored radiographs would eliminate manual labeling mix-ups during in-processing.
- Elimination of handling hazardous materials.

NDCSW Receives Award for Patient Safety Proposal

- The DoD received a total of 32 patient safety proposals, of which 16 were submitted by the Navy.
- Four Navy commands were selected to receive a total of $168,000 in funding.
- In late July, NDCSW received an award for $100,000 to retrofit six existing panographic units.



The Ordering Process

- NDCSW immediately consulted with the vendor, Planmeca, Inc., to purchase an upgrade of six existing panoramic radiographic machines.
- Six upgrades plus 5 bases were ordered.
- NDCSW MID installed the software included in the upgrade.
- NDCSW purchased the hardware including 6 personal computers, 3 laser color printers and a server (originally, 3 ink jet printers were purchased).

The Ordering Process (Cont'd)

- Plan Meca, Inc. coordinated with BDC, MCRD and NDCSW Repair to install equipment and software during MCRD's non-ship week.
- Plan Meca, Inc. recommended ink jet due to higher quality; however, each image took 4 minutes and 40

The First Day Issues

- 596 recruits were processed on the first day after installation.
- Problems noted: equipment overheating and slow print time.

Solutions

- Planmeca, Inc. provided cooling fans to install on the Pano tube heads to prevent overheating.
- Laser Color printers were purchased to replace the ink jet printers.

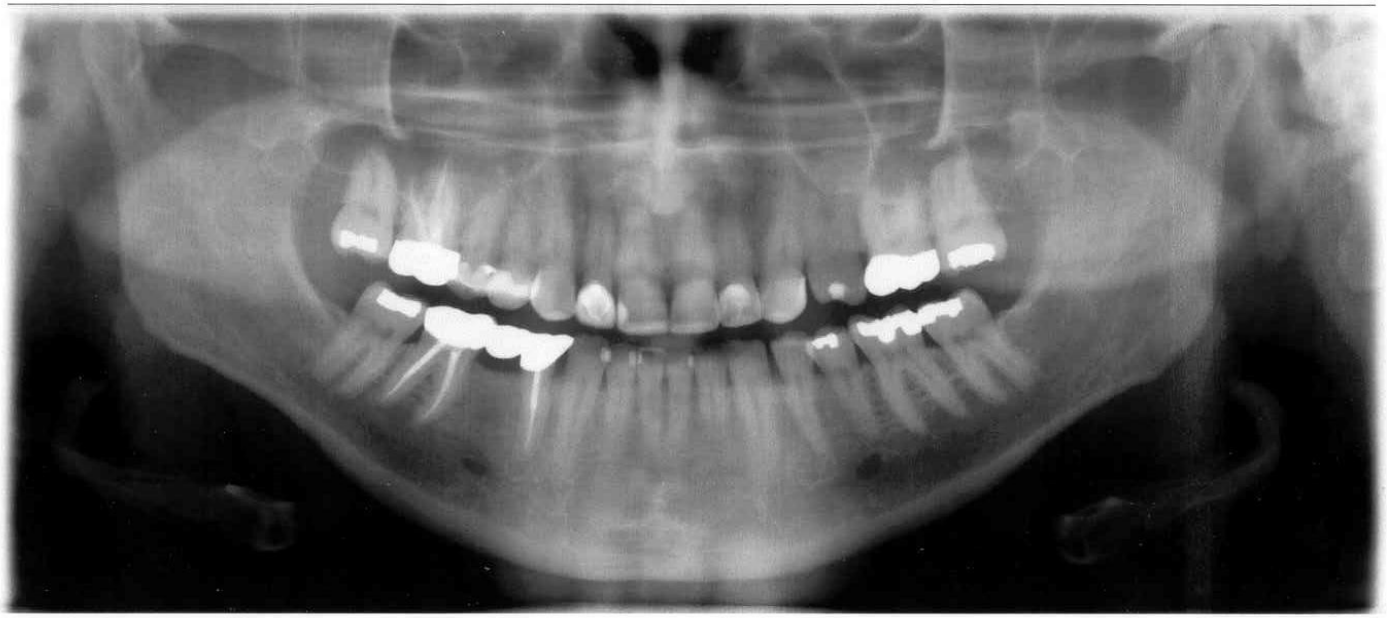
Lessons Learned

- For the volume of patients that come through MCRD (annually 22,000), laser jet printers are more practical than ink jet printers.
- Digital image storage and retrieval must be addressed prior to installation. Additional hard drives for the server will be purchased. Two are needed for back-up purposes. Or is off-site storage feasible? The standard is to store the original image files for forensic purposes.
- It is the standard of care to treat and diagnose from displayed images (not from printouts).

Lessons Learned (Cont'd)

- There must be an appropriate amount of time for training of the staff prior to the switch from analog to digital technology.
- Hard copies must still be printed out and attached to the record. The clinic must have high quality photo image paper available.
- Is equipment suitable for high patient volume? Are additional parts required?
- How long will toner cartridges last?

Sample Digital Image with Data



Patient's name:
Patient ID:
Birth date: 6/21/51
Doctor: 2015
Image taken on: 10/9/2003 5:37:25 PM
Image taken by: xray4
Exposure Values: 68 kV, 7 mA, 18.300 s

DICOM

- The American College of Radiology (ACR) and the National Electrical Manufacturers Association (NEMA), formed a joint committee to develop a standard for Digital Imaging and Communications in Medicine (DICOM) to aid in the distribution and viewing of digital x-rays and visible light images.*
- DICOM ensures image compatibility.
- Images that are DICOM conformant can be transferred across platforms and still retain all data. *
- Images must be stored as .jpeg, .tiff, .gif and .bmp

*_DIGITAL RADIOGRAPHY_ by Lawrence F. Emmott, DDS, Dentistry Today May 1999

DICOM Compatible Software

- Air Techniques
- Dentsply/Gendex
- Dexis
- Instrumentarium
- Orex
- Patterson/Eaglesoft
- Planmeca **
- Schick
- Sirona
- Trophy

**This is currently being used at NDC Southwest

The Future

- Although hard copy radiographs are still required for the patient record, NDCSW wants to install monitors with CPUs in each exam room for digital viewing. This would enhance the quality and the provider can manipulate or enhance the image in real time.
- Eventually, NDCSW would like to implement digital imaging throughout the region to improve patient safety and increase diagnostic capabilities.

QUESTIONS?????